



# ACRYLONITRILE

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Agency for Toxic Substances and Disease Registry ToxFAQs

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This fact sheet answers the most frequently asked health questions (FAQs) about acrylonitrile. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to acrylonitrile occurs mostly from breathing it in the air. Acrylonitrile primarily affects the nervous system and lungs. If it is spilled on the skin, the skin will turn red and blisters may form. This chemical has been found in at least 3 of the 1,177 National Priorities List sites identified by the Environmental Protection Agency (EPA).

## What is acrylonitrile?

(Pronounced ə-krīl'ō nī-trīl)

Acrylonitrile is a colorless, liquid, man-made chemical with a sharp, onion- or garlic-like odor. It can be dissolved in water and evaporates quickly.

Acrylonitrile is used to make other chemicals such as plastics, synthetic rubber, and acrylic fibers. A mixture of acrylonitrile and carbon tetrachloride was used as a pesticide in the past; however, all pesticide uses have stopped.

## What happens to acrylonitrile when it enters the environment?

- ☐ Acrylonitrile may be found in the soil, water, or air near industrial sites where it is made, or at hazardous waste sites where it has been disposed of.
- ☐ Because acrylonitrile evaporates easily, most of it is released to the air from facilities where it is produced and used.
- ☐ In air, acrylonitrile breaks down quickly (about half will disappear within 5 to 50 hours) by reacting with other chemicals and sunlight.
- ☐ Acrylonitrile can enter groundwater by filtering through the soil, but it is not commonly found in groundwater.

- ☐ It is broken down by bacteria in surface water.
- ☐ When it is released to soil, some of it will be broken down by bacteria, but most of it will evaporate to the air or filter to groundwater.
- ☐ Acrylonitrile does not build up in the food chain.

## How might I be exposed to acrylonitrile?

- ☐ Unless you live near a factory where acrylonitrile is made or near a hazardous waste site that contains acrylonitrile, you are unlikely to be exposed to it.
- ☐ Breathing contaminated air near hazardous waste sites that contain acrylonitrile.
- ☐ Working in, or living near, industries where it is manufactured or used.
- ☐ Swallowing food and water that contains small amounts of acrylonitrile.

## How can acrylonitrile affect my health?

Breathing high concentrations of acrylonitrile will cause nose and throat irritation, tightness in the chest, difficulty breathing, nausea, dizziness, weakness, headache, impaired judgment, and convulsions. These symptoms usually disappear when exposure is stopped. If spilled on the skin, acrylonitrile will burn the skin and produce redness and blisters.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

Animal studies show effects from breathing acrylonitrile. These effects include irritation to the nasal cavity and lungs, changes in the breathing rate, fluid accumulation in the lungs, weakness, and paralysis. Decreased fertility and birth defects have been observed in some laboratory animals exposed to high concentrations of acrylonitrile in air or drinking water.

There is evidence that children are much more sensitive to acrylonitrile than adults. In a few cases, children have died following exposure to acrylonitrile vapors that caused only minor nose and throat irritation in adults.

### How likely is acrylonitrile to cause cancer?

The Department of Health and Human Services (DHHS) has determined that acrylonitrile may reasonably be anticipated to cause cancer in people. Studies of people are inconclusive, while animal studies have shown cancers of the brain and mammary glands.

### Is there a medical test to show whether I've been exposed to acrylonitrile?

There is a test that can detect acrylonitrile in blood. Other tests can be used to measure the breakdown products (metabolites) of acrylonitrile in urine. One of the metabolites (cyanide) could come from other chemicals you might have been exposed to, so it is not a definite indicator of acrylonitrile exposure. The results of these tests could also be affected by cigarette smoking. Special equipment is needed for these tests, and they are not routinely available in a doctor's office.

### Has the federal government made recommendations to protect human health?

The EPA recommends that levels in lakes and streams should be limited to 0.058 parts of acrylonitrile per billion parts of water (0.058 ppb) to prevent possible health effects

from drinking water or eating fish contaminated with acrylonitrile. Any release to the environment greater than 100 pounds of acrylonitrile must be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a limit of 2 ppm over an 8-hour workday, 40-hour workweek.

The National Institute of Occupational Safety and Health (NIOSH) recommends that average workplace air should not exceed 1 part per million (1 ppm) acrylonitrile averaged over a 10-hour period.

The federal recommendations have been updated as of July 1999.

### Glossary

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

National Priorities List: A list of the nation's worst hazardous waste sites.

Pesticide: A substance that kills pests.

ppb: Parts per billion.

ppm: Parts per million.

### Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 1990. Toxicological profile for acrylonitrile. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

